

CLAIMS

WHAT IS CLAIMED IS:

1. A method for shaping a group of multiple fibers, comprising the operations of:
- holding the fibers substantially parallel to each other to form a plane defining top and bottom surfaces;
 - positioning an upper crimping assembly of substantially parallel crimping bars proximate the top surface;
 - positioning a lower crimping assembly of substantially parallel crimping bars proximate the bottom surface;
 - aligning the upper and lower crimping assemblies such that the bars are substantially parallel to each other, and the bars form an oblique angle to the fibers;
 - decreasing relative distance between the upper and lower crimping assemblies sufficient to bend the fibers into oscillating shapes that repeatedly curve back and forth longitudinally along the fibers as the fibers pass around bars of the upper and lower crimping assemblies in alternating fashion; and
 - before or while the fibers are bent into the oscillating shapes, heating the fibers sufficiently for the fibers to adopt the oscillating

and/or cooling

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shapes when cooled, at least one said heating and cooling
comprising circulating a heat exchange fluid through one or
more crimping bars of at least one of said upper and lower
crimping assemblies.

2. The method of claim 1, adjacent bars in the upper crimping assembly
being substantially equidistant.

3. The method of claim 1, adjacent bars in the upper crimping assembly
being separated by a first distance, and adjacent bars in the lower crimping
assembly being separated by the first distance.

4. The method of claim 1, the holding operation releasing sufficient
longitudinal tension on each fiber to permit bending of the fibers into
substantially sinusoidal shapes.

7 5. The method of claim 1, the operation of decreasing relative distance
moving at least one of the crimping assemblies such that the crimping
assemblies proceed past each other.

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6. The method of claim 5, the holding operation maintaining sufficient longitudinal tension on each fiber such that movement of the crimping assemblies past each other bends the fibers into oscillating triangular shapes.

~~3~~ The method of claim 1, wherein the heating and cooling are effected automatically in accordance with preprogrammed regimen.

8. The method of claim 1, wherein the heating and cooling includes temperature feedback control.

9. An apparatus comprising a group of multiple parallel fibers formed by a process comprising operations of:

holding the fibers substantially parallel to each other to form a plane
defining top and bottom surfaces;

positioning an upper crimping assembly of substantially parallel crimping bars proximate the top surface;

positioning a lower crimping assembly of substantially parallel crimping bars proximate the bottom surface;

aligning the upper and lower crimping assemblies such that the bars are substantially parallel to each other, and the bars form an oblique angle to the fibers;

decreasing relative distance between the upper and lower crimping

assemblies sufficient to bend the fibers into oscillating shapes that repeatedly curve back and forth longitudinally along the fibers as the fibers pass around bars of the upper and lower crimping assemblies in alternating fashion; and before or while the fibers are bent into the oscillating shapes, heating the fibers sufficiently for the fibers to adopt the oscillating shapes when cooled, at least one of said heating and cooling comprising circulating a heat exchange fluid through one or more crimping bars of at least one of said upper and lower crimping assemblies.

10. The apparatus of claim 9, adjacent bars in the upper crimping assembly being substantially equidistant.
11. The apparatus of claim 9, adjacent bars in the upper crimping assembly being separated by a first distance, and adjacent bars in the lower crimping assembly being separated by the first distance.
12. The apparatus of claim 9, the holding operation releasing sufficient longitudinal tension on each fiber to permit bending of the fibers into substantially sinusoidal shapes.

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